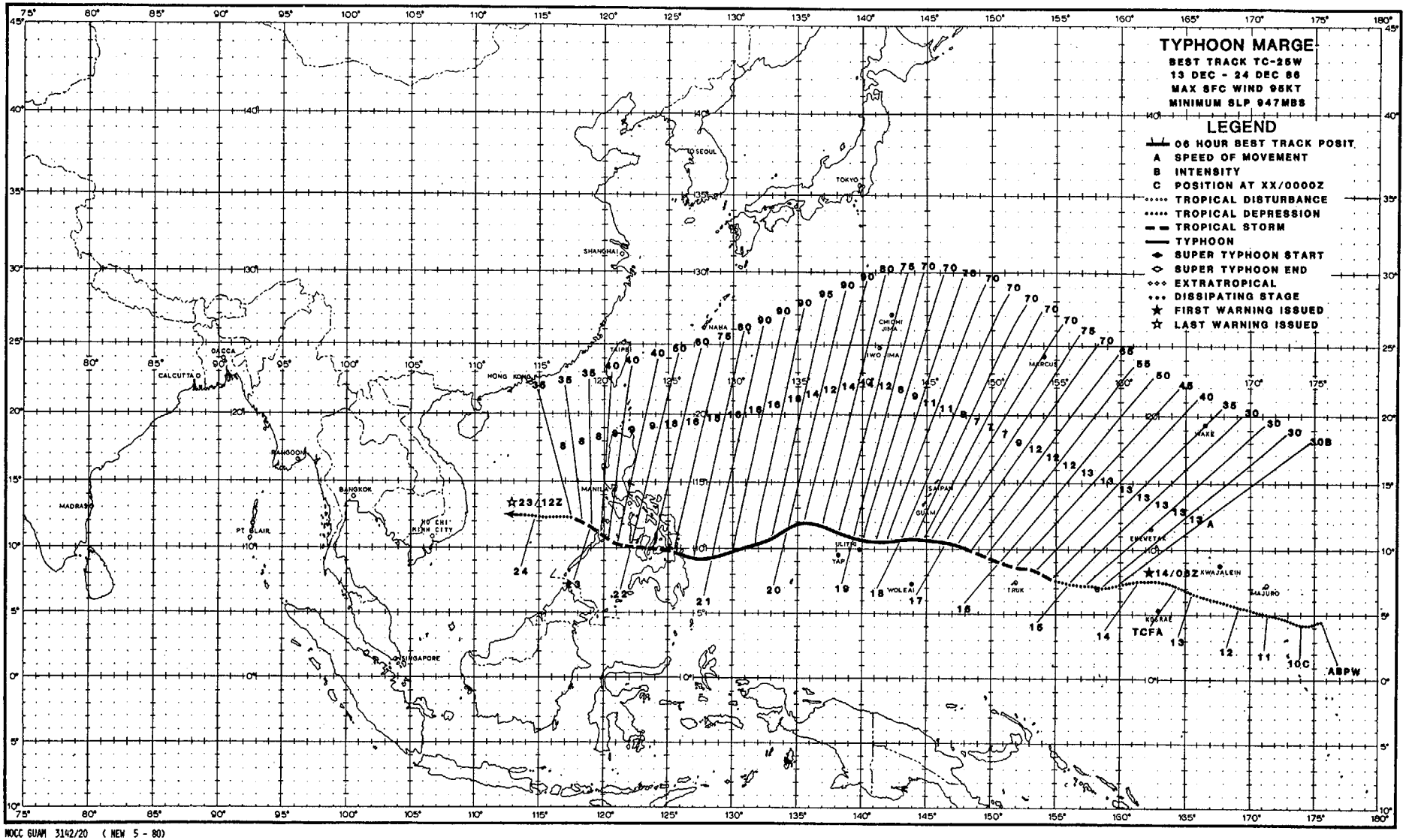

NOCC GUAM 3142/20 (NEW 5 - 80)

Typhoon Marge was a mid-December tropical cyclone that originated in the near-equatorial trough at low latitudes just east of the Marshall Islands. Slow to develop, Typhoon Marge presented a couple of unique forecasting problems which included some unexpected movement in the Philippine Sea.

Referenced for the first time on the Significant Tropical Weather Advisory (ABPW PGTW) on 9 December, the first warning wasn't issued until 140600Z December. During the intervening time, Marge drifted slowly toward the northwest as a large area of disorganized convection. The first Tropical Cyclone Formation Alert valid at 130330Z was based on satellite (Dvorak) intensity estimates of 20 to 30 kt (10 to 15 m/sec) winds and decreasing sea-level pressure. The first warning followed on the 14th and was based on satellite imagery which indicated an increase in convection and upper-level organization. From the 15th through the 16th, Marge's mean track was west-northwestward as the forecasts followed the under-the-ridge scenario.

Based on the Dvorak analysis of satellite imagery at 150300Z, indicating a maximum wind of 35 kt (18 m/sec), Tropical Depression 25W was upgraded to tropical storm intensity (see Figure 3-25-1). The

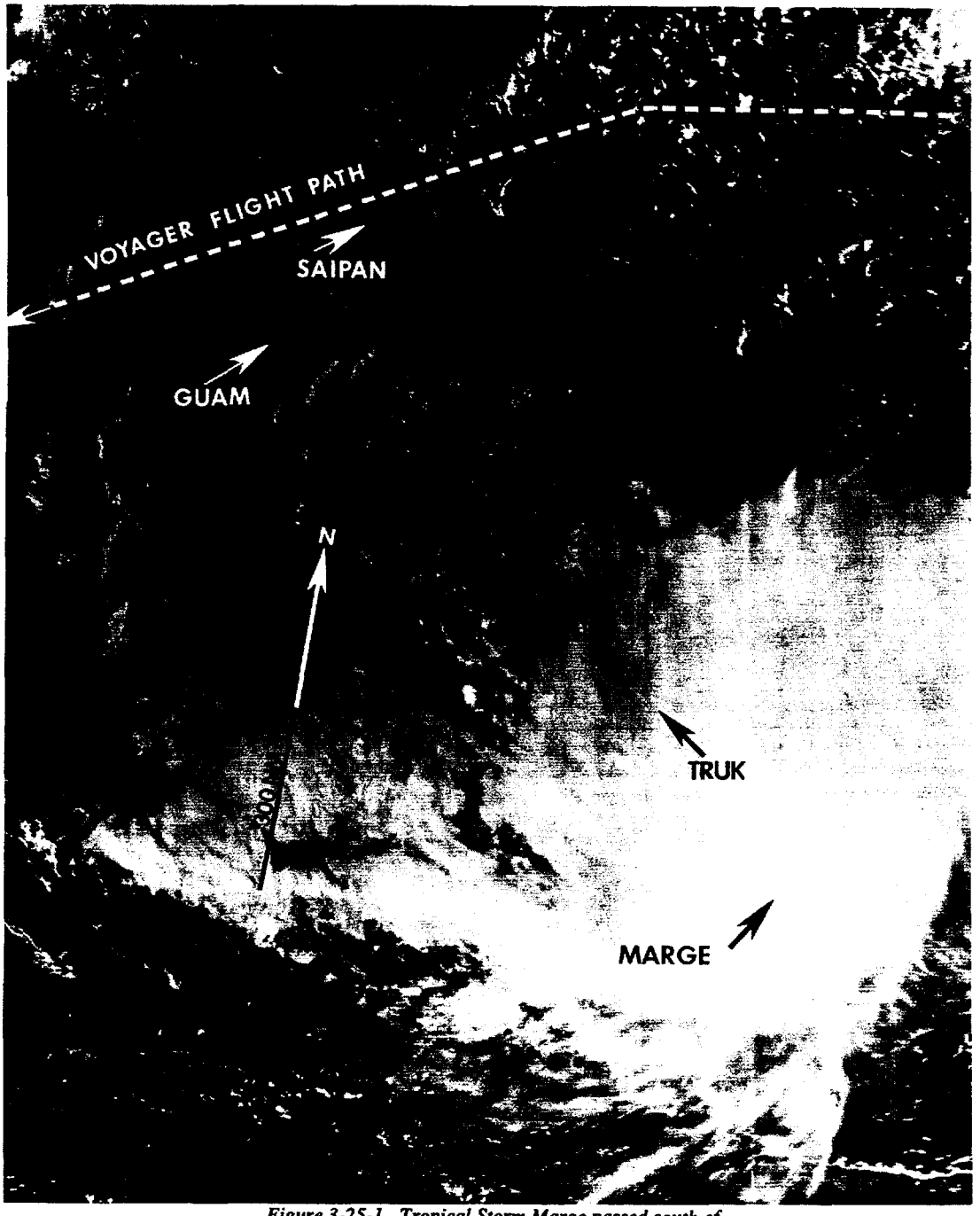

Figure 3-25-1. Tropical Storm Marge passed south of Guam just nine hours before Voyager left on the start of its record-setting flight (150517Z December NOAA visual imagery).

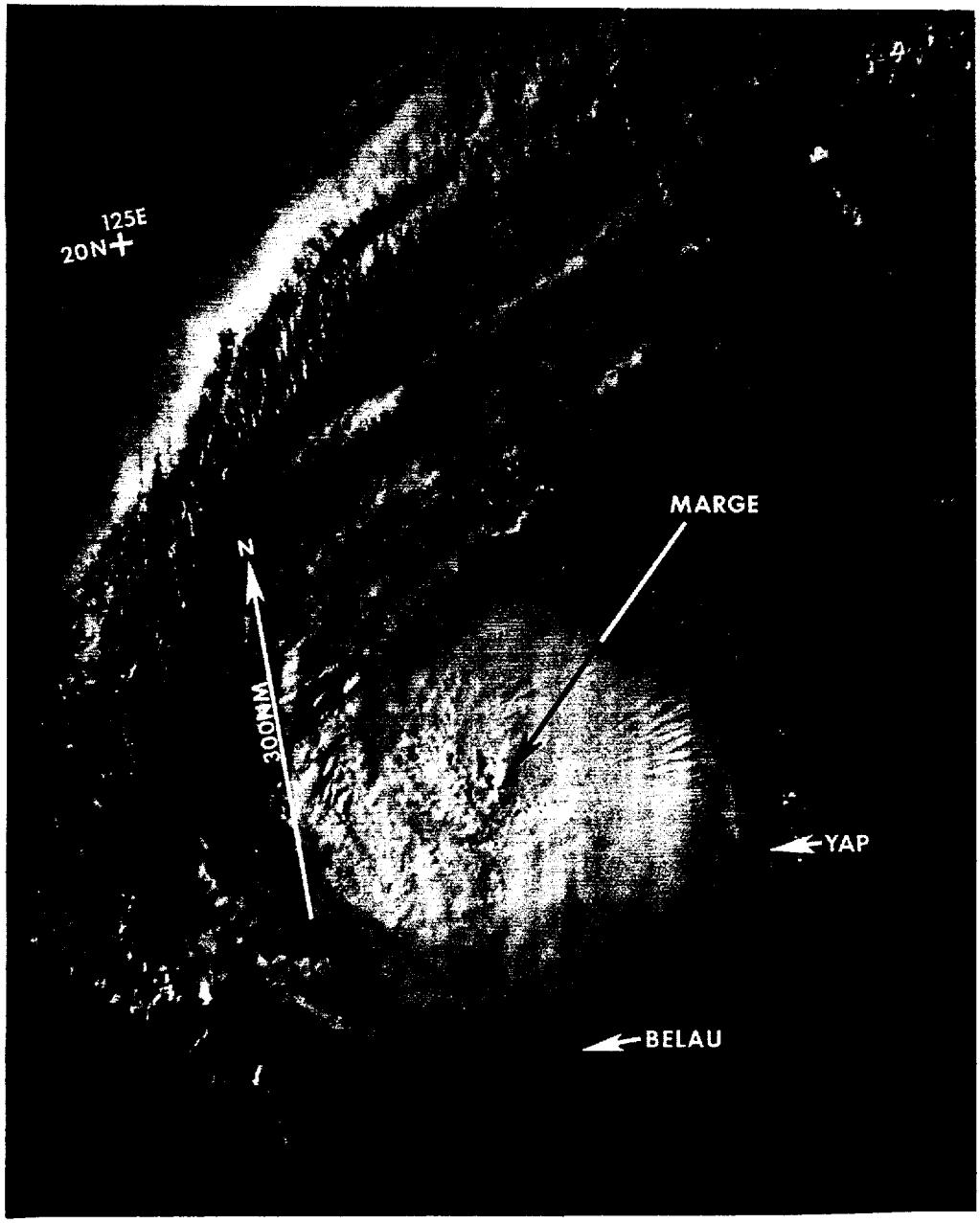

Figure 3-25-2. Marge six hours prior to reaching maximum intensity (192236Z December NOAA visual imagery).

first aircraft reconnaissance mission on the 15th found a minimum sea-level pressure (MSLP) of only 1000 mb, 30 kt (15 m/sec) winds and did not close off a circulation. The next aircraft mission early on the 16th located a vortex with a MSLP of 996 mb and maximum surface winds of 60 kt (31 m/sec). The 161200Z warning upgraded the system to a typhoon.

The first forecast problem with Marge arose at 170000Z, when satellite fixes and aircraft reconnaissance observations began indicating that Marge was no longer moving as forecast toward the west-northwest, but in a more westerly direction. The computer prognostic guidance persisted with the now incorrect west-northwest movement. From 170000Z to 181800Z Marge moved due westward along the edge of the modifying polar air and passed 160 nm (296 km) south of Guam. No evacuations or significant damage to the island occurred.

The next forecast problem arose at 200000Z as Marge began slipping toward the west-southwest. JTWC's initial response was to consider the southward movement as a short-term event and the forecasts reflected this philosophy. This proved to be in error as Marge was forced further southwestward by a strong surge of polar air from the Asian landmass. Marge's unforecast movement in the Philippine Sea caused considerable concern for shipping. For example, the USS Proteus (AS 19) passed within 60 nm (111 km) of the center of Typhoon Marge, circled around its southwest quadrant and experienced winds of 50 kt (26 m/sec) at 210430Z. There was minimal damage to the ship and no personnel were injured. At that time Marge's maximum winds near the center were 80 kt (41 m/sec) and had decreased from a maximum of 95 kt (49 m/sec) earlier at 200600Z (see Figure 3-25-2).

After entering the Philippine Islands, the system weakened and changed course towards the northwest. It then tracked into the South China Sea and dissipated over water.

During Marge's lifetime, aviation history was being made. The Voyager, a light-weight, graphite fiber-bodied aircraft, piloted by Burt Rutan and Jeana Yeager, departed Edwards Air Force Base, California, on 15 December at 1402Z (14 December at 11:02 A.M. EST) in a record-setting attempt to circle the globe on a single tank of fuel. Initially, the flight plan routed Voyager south of the equator, passing just north of Australia on the Pacific portion of the journey. However, a very active monsoon trough present in the western North Pacific at this time forced a change in plans. Following coordination with JTWC, Voyager was rerouted north of the Mariana Islands. While it winged its way west, Marge continued to intensify. Although, at one point it appeared the Voyager might have to terminate its mission, the low-level inflow winds into Marge's center actually aided in the flight. Despite some moderate turbulence, as a consequence of flying between two of Marge's spiral bands to pick up increased tail winds of 35 kt (65 km/hr), Voyager was able to reduce fuel consumption and speed onward to complete a successful mission.